



Fig. 4 Dependence of composite wear and wear resistance on the amount of carbide present in the gold deposit. All four systems investigated—acid cyanide and alkaline sulphite golds with titanium and tungsten carbides—gave approximately the same relationship

composites. It is probable that mechanical restraint of matrix deformation by the hard non-deformable particles plays an important role in strengthening.

Conclusions

Composite gold-refractory carbide coatings formed by electrodeposition have been found to have considerably enhanced hardness, strength, and rubbing wear characteristics compared to gold electroplate. Because the carbide particles are chemically inert the corrosion resistance and electrical contact resistance properties approach those of pure gold.

It is considered that such deposits could find extensive use in sliding contact applications in which exposure and tarnishing of substrate base metal through wear of the gold plate is a problem. Similar considerations may encourage the use of composite gold electroplates in decorative jewellery applications especially with the possibility of obtaining various attractive finishes by varying the size and volume of co-deposited particles.

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Bibliographic Reviews on the Electrodeposition of Gold Alloys

While the extensive literature on gold plating is readily available, the subject of the deposition of gold alloys—in which so much interest is now being taken—is not so well documented. Published information in this field has now been assembled by Dr W. S. Rapson of the Chamber of Mines of South Africa Research Organisation and has been incorporated in a series of bibliographical reviews as follows:

- Part I Electrodeposition of gold with copper and silver
- Part II Electrodeposition of gold with zinc, cadmium, gallium, indium, thallium, tin, lead, antimony and bismuth
- Part III Electrodeposition of gold with cobalt, nickel and iron
- Part IV Electrodeposition of gold with the platinum group metals, and with chromium, molybdenum, uranium, tungsten and manganese.

Copies of these reviews may be obtained by writing to the Research Organisation, Chamber of Mines of South Africa, P.O. Box 809, Johannesburg, South Africa.